$$=\frac{48}{\pi^6}\int_0^{\frac{1}{2}\pi}\int_0^{\theta}\int_0^{\phi}[(\pi-2\theta)(\pi-2\phi)(\pi-2\psi)]d\theta\,d\phi\,d\psi=\tfrac{1}{8}.$$

$$A=\frac{\frac{1}{2}\int_0^a\int_0^a\int_0^a\int_0^\pi\int_0^\pi[xy\sin\delta+yz\sin\gamma-xz\sin(\delta+\gamma)]x\,dx\,y\,dy\,z\,dz\,d\delta\,d\gamma}{\int_0^a\int_0^a\int_0^a\int_0^\pi\int_0^\pi x\,dx\,y\,dy\,z\,dz\,d\delta\,d\gamma}$$

$$=\frac{8}{\pi a^6}\int_0^a\int_0^a\int_0^a(x+z)xy^2z\,dx\,dy\,dz=\frac{8a^2}{9\pi}.$$

PROBLEMS FOR SOLUTION.

ALGEBRA.

357. Proposed by V. M. SPUNAR, M. and E. E., Chicago, Illinois.

Solve the system

$$\sqrt{(x^2+a^2+b^2+c^2)}=\sqrt{(y^2+b^2+c^2)}+\sqrt{(z^2+b^2+c^2)},$$
$$\sqrt{(y^2+a^2+b^2+c^2)}=\sqrt{(x^2+c^2+a^2)}+\sqrt{(z^2+c^2+a^2)},$$
$$\sqrt{(z^2+a^2+b^2+c^2)}=\sqrt{(x^2+a^2+b^2)}+\sqrt{(y^2+a^2+b^2)}.$$

358. Proposed by V. M. SPUNAR, M. and E. E., Chicago, Illinois.

Show that $\frac{n(n+1)\ldots(n+m-1)}{m!}-n\frac{n(n+1)\ldots(n+m-4)}{(m-3)!}+\frac{n(n-1)}{2!}\cdot\frac{n(n+1)\ldots(n+m-7)}{(m-6)!}-\ldots=0$, if $m>2n$; and $=1$ if $m=2n$.

359. Proposed by V. M. SPUNAR, M. and E. E., Chicago, Illinois.

Show when $1/(1-x)(1-x^3)(1-x^5)(1-x^7)\ldots=(1+x)(1+x^2)(1+x^3)(1+x^4)\ldots$

GEOMETRY.

390. Proposed by PROF. R. C. ARCHIBALD, Brown University, Providence, R. I.

Find, geometrically and without introducing focal properties, the locus of the vertices of the conjugate parallelograms of an ellipse.

391. Proposed by W. J. GREENSTREET, M. A., Editor, The Mathematical Gazette, Stroud, England.

An ellipse is inscribed in the triangle of reference and has one focus at (sec$A$, sec$B$, sec$C$). Find the other focus and the sum of the squares of the axes of the ellipse.

392. Proposed by V. M. SPUNAR, M. and E. E., Chicago, Ill.

A tangent to a curve at any point P cuts the tangent and the normal at a fixed point O in the points M and N, and the rectangle $OMP'N$ is completed. Find the curve which is such that the triangle formed by the tangents at any three points P, Q, R is equal to the triangle formed by the corresponding points P', Q', R'.